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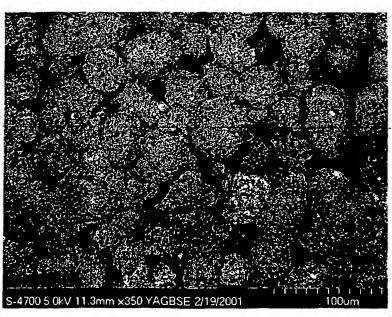
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(54) Title: LI₄TI₅O₁₂, LI (4-α) Z_αTI₅O₁₂, OR LI₄Z_βTI (5-β)O₁₂ PARTICLES, METHODS FOR OBTAINING SAME AND USE AS **ELECTROCHEMICAL GENERATORS**



(57) Abstract: The invention concerns a method for synthesising Li₄Ti₅O₁₂, Li₄Z_BTi_(5-B)O₁₂, OR Li_(4-a) Z_aTi₅O₁₂ particles preferably λ having ?spinel structure, wherein: β is greater than 0 and not more than 0.5 (preferably having spinel structure); α represents a number greater than zero and not more than 0.33, Z representing a source of at least a metal selected among the group consisting of Mg, Nb, Al, Zr, Ni, Co. Said particles coated with carbon exhibit particularly interesting electrochemical properties as anode and/or cathode component of electrochemical generators.



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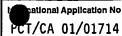
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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C01G23/00 H01 H01M4/48 According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 COIG HOIM Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practical, search terms used) CHEM ABS Data, EPO-Internal, WPI Data, PAJ C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. X,P PATENT ABSTRACTS OF JAPAN 1,4,10, vol. 2000, no. 26, 12,15, 1 July 2002 (2002-07-01) 24,33-42 & JP 2001 243950 A (TOYOTA CENTRAL RES & DEV LAB INC), 7 September 2001 (2001-09-07) abstract P,A US 2001/031401 A1 (ETO KIYOSHI ET AL) 1-42 18 October 2001 (2001-10-18) paragraphs '0006!-'0013!,'0018!-'0042!,'0065!-'0068! A EP 0 617 474 A (MATSUSHITA ELECTRIC IND CO 1-42 INC) 28 September 1994 (1994-09-28) page 3, line 45 - line 51 page 4, line 37 - line 40 page 5, line 46 -page 7, line 2 Further documents are listed in the continuation of box C. Patent family members are listed in annex. Special categories of cited documents: "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the "A" document defining the general state of the art which is not considered to be of particular relevance invention *E* earlier document but published on or after the international "X" document of particular relevance; the claimed invention filing date cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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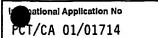
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C./Continue	tion) DOCUMENTS CONSIDERED TO BE RELEVANT			
	Citation of document, with indication, where appropriate, of the relevant passages			
A,P	US 6 221 531 B1 (THACKERAY MICHAEL M ET AL) 24 April 2001 (2001-04-24) cited in the application the whole document	1-42		

<u>IN</u>TERNATIONAL SEARCH REPORT

information on patent family members

pational Application No PCT/CA 01/01714

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
JP 2001243950	Α	07-09-2001	NONE		
US 2001031401	`A1	18-10-2001	JP JP JP	2001213622 A 2000302547 A 2001213623 A	07-08-2001 31-10-2000 07-08-2001
EP 0617474	A	28-09-1994	JP CN DE DE EP KR US	6275263 A 1095191 A ,B 69404517 D1 69404517 T2 0617474 A1 9707518 B1 5545468 A	30-09-1994 16-11-1994 04-09-1997 15-01-1998 28-09-1994 09-05-1997 13-08-1996
US 6221531	B1	24-04-2001	NONE		